

WHAT IS CLAIMED IS:

1. A semiconductor device comprising a silicon substrate and an NMOSFET formed on the silicon substrate, the NMOSFET including n-type source/drain main regions containing arsenic as n-type impurities, and
5 n-type source/drain buffer regions located below the source/drain main regions and in contact therewith, the source/drain buffer regions having arsenic and phosphorous as n-type impurities at a concentration lower than an impurity concentration in the source/drain
10 main regions, the concentration of the phosphorous in the source/drain buffer regions being smaller than a concentration of the arsenic therein.

2. The semiconductor device as defined in claim 1, wherein the NMOSFET comprises a channel region between the source/drain main regions, and two n-type extension regions extending from the source/drain
5 regions and opposing to each other across the channel region, and the source/drain buffer regions do not extend beyond the extension regions toward the channel region.

SUB 7
B1 3. A method for manufacturing a semiconductor

Sub B17 device comprising the steps of:

5 implanting arsenic ions in a semiconductor substrate at a first acceleration energy level which suppresses a reverse channel effect to form arsenic ion implanted regions :

10 implanting phosphorous ions in the arsenic ion implanted regions, following the arsenic ion implanting step, at a second acceleration energy level lower than the first acceleration energy level, so as to form a concentration peak of the phosphorous ions located in the arsenic ion implanted regions;

15 heat-treating the ion-implanted regions for activation of the arsenic ions and the phosphorous ions to form source/drain regions; and

 forming an NMOSFET having the source/drain

4. The method as defined in claim 3, wherein n-type impurities are implanted in the NMOSFET region to form an n-type extension region before the arsenic and phosphorous implanting step.

5. The method as defined in claim 3, wherein a dosage of the arsenic ion is determined to obtain electrical characteristics required for the NMOSFET, and an acceleration energy and a dosage of the phosphorous

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